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ABSTRACT

This paper describes a curriculum design model to train research and development personnel under USOE-NIE funding. This design model, called PIC (Process Individualization Curriculum), was chosen for coverting on-campus courses to extra-mural self-instructional courses. The curriculum specialists who work with professors to individualize their courses were trained in these design procedures. (MJM)

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THE PIC MODEL:
STRUCTURE WITH HUMANISTIC GOALS

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Introduction

Some of the proponents of humanistic education charge or imply, in their enthusiasm for openness and student autonomy, that structured curricula are unconcerned with human values. What is more, self-instructional materials, which are the major component of extra-mural instruction, are especially suspect because they are. necessarily, prestructured and prepackaged. This paper attempts to refute this argument by showing that curricula which are highly responsive to individual needs and attentive to human values can be designed on a model which relies very heavily upon a rational structuring of instruction and on use of the fundamental structure of the discipline for that structuring. Employing procedures that emphasize learning-to-learn, a Process Individualized Curriculum model, or PIC (Gow, 1973d), is used for development of the college and post-baccalaureate level curricula of the University of Pittsburgh's External Studies Program. The rationale for its use leans heavily on the need for a model for higher education which is based on discipline structure, and the experiences of this program strongly support the compatability of structure with humanistic goals (Gow, 1973a).

Structure, as used in current discussions of education, has two meanings: structure in the sense of structure of a discipline, the

fundamental conceptual basis for organizing the knowledge in a particular subject area, is one of the meanings; structure in the sense of curriculum that is designed through a process of task analysis is the second. That both kinds of structure should be attended to in designing instruction for higher education and that this promotes humanistic goals can be claimed and supported by the evidence of three years of experience converting on-campus courses to a structured self-instructional model. Use of a structured model by curriculum design students to design a wide variety of courses, during this same period, also supports the claim that humanistic ends can be attained by structured means.

It would beg the argument, however, merely to prove empirically that it can be done without explaining why it should be done. If humanistic as well as academic ends can be achieved without a lengthy and complex process of structuring the instruction, systematically, why should so much effort be expended? If discipline structure need not be a basis for such structuring, then why worry about identifying the fundamental conceptual framework of the subject that is being taught?

"The Process of Education Revisited"

Before defending the discipline structure as a basis for curriculum design, it might be well to go back a few years to the period when structure of the discipline was engaging the interest and attention of many scholars who were attempting to identify the fundamental conceptual structure of their disciplines for use in designing elementary or secondary school curricula. Growing out of the Woods Hole Conference on improving education in science, Jerome Bruner's The Process of Education, published

in 1960 (Bruner, 1960), had had a profound effect on education. The first half of the decade following its publication saw the reform movement in education dedicated to improving the academic quality of the curricula in the schools through an alliance of university scholars and public school teachers. That these curricula should be based on the fundamental structure of the discipline was, in Bruner's words, "a brave idea and a noble one, for all its pitfalls" (p. 18).

A little more than a decade after Woods Hole in September 1971, Bruner wrote "The Process of Education Revisited" (Bruner, 1971). Meanwhile the educational reform movement, in the few years immediately preceeding the article, had undergone a shift in emphasis from concern for the academic quality of school offerings to despair for the quality of life in the schools. "The Process of Education Revisited" reflected this despair. If he had a choice of a curriculum project for the 70's, Bruner said, he would try to find a means of bringing society "back to its sense of values and priorities in life." He "would be quite satisfied to declare, if not a moratorium, then something of a de-emphasis on matters that have to do with the structure of history, the structure of physics, the nature of mathematical consistency, and deal with it rather in the context of the problems that face us" (p. 21).

The Structure of the Discipline Revisited

Yet, all of the arguments for discipline structure as the basis for instruction are as valid today as they were in 1960:

> Knowledge learned in terms of broad, generalizable concepts is dependent on mastery of the structure of subject matter.

> These fundamental ideas at the heart of any discipline have wide applicability to new situations and new problems.
>
> Understanding fundamentals makes a subject more comprehensible.
>
> Learning fundamental principles permits reconstruction of details when needed.
>
> The best way to create interest is to make something worth knowing. This means making it usable, as fundamental principles are usable, in new situations (Bruner, 1960).

In addition, others have supported concept learning as facilitating retention and transfer (Bloom, et al., 1971; Klausmeier, 1966) and encouraging more effective thinking and problem solving (Gagné, 1965).

To know the methods of the discipline, or the syntactical structure as Schwab (1964) calls it, is to know how to find out more about a subject. The processes the student uses are the intellectual skills he needs if he is to acquire, organize, and use the information fundamental to the discipline. This, of course, is particularly important at the higher education level.

In addition to these points which are persuasive particularly in terms of subject-matter comprehension and use, other advantages may be cited for structuring instruction on the fundamental structure of a discipline in the interest of meeting the individual needs of the students. When instruction is primarily conceptual, a variety of examples of each concept may be offered so that those most relevant to the individual student and appropriate for his stage of intellectual development and experience can be selected. This makes it possible for the student to progress through instructional sequences which are highly adaptable to his requirements and interests.

The process of concept assimilation and accommodation into the individual student's cognitive structure is a highly individualized experience, as well.

If basing instruction on the conceptual and syntactical structure of a discipline, on the concepts, principles, generalizations, constructs, and methods of a subject-matter field, make it easier to learn and retain, more interesting, and more readily applied to new situations and problems, it is a potent argument for basing instruction on such a framework. If, in addition, such a structure provides for individual differences, it would seem that instead of a de-emphasis on discipline structure as Bruner suggested in "The Process of Education Revisited," we need a re-emphasis. Perhaps structure of a discipline should be revisited, at least by the curriculum designer.

The PIC Model

A course which teaches curriculum design using the Process Individualized Curriculum model (PIC), was the first course offered by the External Studies Program at the University of Pittsburgh. Developed at Pitt's Learning Research and Development Center to train educational research and development center personnel, under a grant from the National Institute of Education, the course was field tested with the External Studies Program. The model became the basis for all External Studies courses.

This structured model (PIC) calls for the usual elements of a systems or programmed approach to instruction: sequences of instructional objectives, a system for placing students and monitoring their progress

and materials for teaching to the objectives. The procedures for developing each element, however, differ somewhat from those of the usual structured model. In addition to the usual content and task analyses (Gagné, 1968), there is a concept analysis to identify the hierarchy of elements of the discipline structure which will be taught, and a systematic sampling of skills. Bloom's Taxonomy (1956) is used to generate objectives demanding complex intellectual processes in order to encourage learning-to-learn. Krathwohl's Taxonomy (1964) is employed for affective hierarchies.

Structure can be liberating rather than restricting, primarily because the student knows what is expected of him and is able to direct his own learning. By following structured model procedures, the curriculum designer is able to plan, systematically, the setting, methods, media, and instructional strategies suitable for the range of students in his target population and the concepts and skills he is teaching. He can offer large group, small group, or individual instruction, although individual packets providing planning and instructional materials must be available to each student so the option of independent work is available. The designer can design as many paths to mastery of objectives and as much variety in media, strategies, and content instances as he has time, facilities and need to provide. The student, then, can select objectives and means of attaining them that best satisfy his own requirements.

Meeting the Needs of Higher Education

The use of a curriculum model based on discipline structure has been particularly appropriate for higher education. The concepts, principles, generalizations, and constructs of a field must be mastered at this level

and a design model which builds on these elements facilitates individualization of instruction.

The need to individualize university instruction has grown as student populations have become more heterogeneous. Only a few successful attempts have been made to provide prestructured individualized instruction for on-campus students, notably at Bucknell University (Moore, Hauck, & Gagné, 1973). Extra-mural instruction, however, has long included prepackaged instructional materials, often of poor quality. Development of models and procedures for individualizing elementary and secondary school curricula by educational research and development centers offers an opportunity for vastly improving the quality of extra-mural instruction and for making it more adaptive to individual needs.

That extra-mural instruction itself is becoming increasingly essential has been recognized by many educators. Michael Scriven (1972) has suggested there will be a gradual shading of the boundaries of school life and the line between in-school and out-of-school education may evaporate leading to implementation of an "educational community" (p. 203). The 1971 NSSE Yearbook concluded that "the walls of the schools are literally and figuratively being torn down" (McClure, 1971). Brown (1972) saw an urgent need to develop a new system of education for those by-passed by our present system or needing renewal or personal fulfillment. To Joyce (1971, p. 335), the curriculum worker "can become a full participant in the basic contemporary task of revitalizing the humanistic possibilities in the society," in part by bringing "educational mission and means together in the real world." This would require "engineering to create the material,

the social systems and the instructional systems that will activate them" (p. 341).

> By developing more options, making more and more kinds of education commonplace, and giving students the power to educate themselves in increasingly humane ways, the curriculum maker will be making his contribution in the search for an increasingly humanistic education (Joyce, 1971, p. 335).

The External Studies Program at the University of Pittsburgh is a step in the direction predicted or proposed by these educators. The University goes to the student. Tests may be taken at libraries, educational television classes may be a part of the instruction, and students may build credits towards degrees, working anywhere in the world. Only three Saturday interaction sessions a trimester are on-campus and they, often, are optional.

For mothers of small children, invalids, rural residents, the aged, people whose employment hours are irregular, the opportunity to earn college credits, to take courses for self-fulfillment, or to be recycled in a new career, without necessity for attendance at regular classes is a tremendous boon. That the courses offered are of the same quality, with the same professors who teach them on campus is unusual for extramural instruction. This is made possible by use of curriculum specialists who work with the professors helping them to individualize their courses and make them self-instructional. The structured model allows the student to manage his own learning without continuous monitoring by a professor.

These, then, are the reasons why structure is the design model of choice: it provides flexible individualized instruction that is interesting,

applicable to new situations and problems, and is readily learned and retained. These are advantages at all levels of instruction. It gives to instruction a certitude that is lacking in indefinable "learning experiences," frees the student from the dependance on an instructor, and makes it possible for him to pursue his education without the limitations imposed by required regular attendance at college classes.

Structure With Humanistic Goals

To prove that structure and humanistic goals are compatible is a very difficult task for a curriculum designer who measures goal attainment in terms of performance objectives. Few of the descriptive words used to portray humanistic education can be translated readily into behavioral terms. This problem has led defenders of behavioral objectives to trade assertions with the humanists. Beck (1970) has suggested that humanistic goals are ends; behavioral objectives, the means to those ends. Popham (1968), in the belief that "those who discourage educators from explicating their instructional objectives are often permitting if not promoting, the same kind of unclear thinking that has led in part to the generally abysmal quality of instruction in this country," refuted each of eleven arguments given against behavioral objectives.

Recognizing that curricula seldom are pure in their orientation, Eisner and Vallance (1974) applied the five curricular orientations they identified to analyze a single curriculum and Atman (1975) used this technique to demonstrate the eclectic nature of her structured competency based teacher-training program. It is the tendency of those who oppose structure to assign structured curricula to a strictly technological orientation. Yet,

there is no reason to expect that structured curricula need employ limited options for use in classroom situations. Extra-mural instruction, of course, provides only limited in-class personal interaction. For those who choose this kind of learning, the other unique advantages it offers apparently are persuasive in the choice. Although students enjoy the limited interaction External Studies provides, and often seek out more, by arranging seminars with others in the course, they seem to feel the time saved by not attending classes can be put to more profitable use studying alone. This may be because it is highly motivated students who take advantage of this kind of learning opportunity.

Other than in-class interaction, however, all varieties of choice in method, media, and instructional strategies are possible with pre-packaged, structured instruction. The External Studies curriculum design course, which is itself based on the PIC structured model, teaches procedures for developing materials and systems to implement instruction which, if analyzed, would be found to fit into each of the five curriculum orientations mentioned by Eisner and Vallance (1972): the cognitive processes approach, curriculum as technology, curriculum for self-actualization and consummatory experiences, curriculum for social reconstruction and academic rationalism. It is the crux of the communication problem between structuralist and humanists who are critical of structure, that the latter place themselves in the self-actualization camp, primarily, and relegate structuralists to the technology camp, soley. Today's structuralists refuse to remain so narrowly defined in the belief that any appropriate theoretical approach may be implemented by structured design

procedures. They claim, indeed, that preplanning and prestructuring frees the curriculum designer from the limitations of a single orientation. Structured curriculum design models and procedures are tools which make it possible to employ a variety of Models of Teaching.

Joyce and Weil, in their book of that title, argue for a "cafeteria of alternatives" with different models for different ends. Most of the models they cite are taught in the design course as options which can be used as instructional strategies in structuring instruction on the PIC model. These include strategies described by Bruner, Ausubel, Taba, Schwab, Piaget, Hunt, Rogers and Skinner (Joyce & Weil, 1972; Gow, 1973d). Strategies from these models were used in designing the course and have been used by students of the course in designing curricula to meet their own students' needs (Gow, 1973b).

As a pragmatic truth test, it might be useful to measure definitions of humanistic education against the structured curriculum course and some of the curricula developed by students of the course, since information was collected in the field test for the R&D Training Project Report to the National Institute of Education. While the dictionary definition of humanistic is "characteristic of the humanities or human nature," those who urge that schools should make their curricula more humanistic use the term in many different senses. To some, humanism requires a curriculum of affect (Weinstein & Fantini, 1970). To some, humanism is person-oriented, concerned with self-learning, self-growth, self-fulfillment, and self-renewal (Purpel & Belanger, 1972). Others seem to combine all these meanings in self-actualization (Rogers, 1969; Combs & Snygg, 1959; Maslow, 1968).

Self-selection of curriculum content and student-directed learning are considered essential to a humanistic curriculum by most of those who oppose structure and these, they believe, cannot be achieved if the curricular materials are packaged in advance of instruction.

A curriculum of affect is a curriculum that is concerned with feelings and attitudes. Affective objectives, under the PIC model are structured by Krathwohl's Taxonomy (1964) and the kinds of behavior which will be accepted as evidence of attitude change are determined when the instructional materials are designed. Several of the students of the course designed curricula of affect and the majority of the student products used carefully structured affective as well as cognitive dimensions. A drug education course for high school students and a personal development course for community college students heavily emphasize affective goals (Gow, 1973b).

Affective objectives receive considerable attention in statements of educational goals, but even in courses which purport to teach to such objectives, usually it is the subject-matter knowledge that is tested. The affective goals remain statements of intent, often forgotten. When hierarchies of affective objectives are carefully structured, however, and examples of the acceptable behavioral evidence of attainment are prepared in advance to further define the objectives, it is possible to observe progress towards their attainment. Attitude scales can be constructed for pre- and post-testing as well.

For all External Studies courses, each unit is accompanied by an evaluation questionnaire which feeds back to the program evaluators and the

instructor data on student attitudes towards the instructional materials, making feasible the continuous monitoring of this dimension.

That the structured model lends itself to design of curricula that are person-oriented and concerned with self-learning, self-growth, and self-renewal is quite clear from the experiences with students in the field test of the course. Those who sought out this method of dealing with their personal teaching problems and who continued through all 12 units (9 post-baccalaureate credits) of the course persevered largely, In order to design courses which would promote these objectives. Several of the students were concerned when legal changes put slow learners into regular classes, giving them an unusually broad span of ability level in a single class. It was to meet the needs for individual attention and to provide for individual person-oriented instruction that they came to learn how to design structured materials. Most of these students developed individualized course materials which provided for self-growth. An anecdotal record of some of these courses relates, the self-renewal effect on the slow learners, especially, of one short course in literature which was adopted district-wide (Gow, 1973b).

Of course, in External Studies self-learning, self-growth, and self-renewal through structured curricula are what it is all about. It would be repetitious to dwell at length on it. The Program provides self-fulfilling educational opportunity to adults of all ages and backgrounds. Personal satisfaction, job advancement, skills to achieve a personal or social goal, or credits towards a college degree may be the motivation.

Not all of the motivation is strictly related to solving educational problems even in the professional design course. One example of the self-renewal characteristic of this structured course was provided by the student, a biophysicist who travelled frequently to Japan on business and carried his course materials with him. He had long harbored a desire to develop a course in navigation for recreational boating. In the course he learned how to do it, and did (Gow, 1973b).

Finally, self-selection of curriculum content and student-directed learning, which the humanists consider essential, are both possible and expected under the PIC model. Of course, self-selection is within limits of the pre-designed instruction. All formal instruction requires goals and even the most unstructured curriculum implies goals. Paths to those goals may be as varied as students. Degree of self-direction that is permitted may range from a slow, carefully structured progression for the student being taught to direct his own learning, to immediate control over his own learning by the mature student capable of self-direction. The latter is the predominant type of structured External Studies instruction. The range of options often depends on the length of time the course has been operational and the designer has had time to develop them. In the curriculum course the students study the units they need and want to study and design the curricula they want to design and develop. They direct their own work to the extent that one wife continued the course in Germany where her husband was stationed with the Army and another was able to pursue her work in California when her husband received a faculty appointment there.

In addition to providing elements of humanistic education, which have been specified by writers who designate themselves as humanists, there are other components of structured curricula which contribute to individualization and to human values. Consider the following:

1. Instruction which is hierarchically sequenced allows the individual student to experience success rather than failure. It facilitates learning by requiring mastery of lower levels before proceeding to higher levels.
2. Behavioral objectives tell the student what he must know or be able to do, under what conditions, how well. This provides him with a blueprint of his learning tasks and allows him to become a self-directed learner. Nor does it preclude open-ended or expressive objectives which require a creative response, as we have seen with the objectives of the curriculum course which require an original curriculum design. Criteria for evaluation of such objectives are established when the objectives are written.
3. The individual student is not compared with other students as in curricula which employ norm-referenced testing. This model assesses students' progress on the basis of criterion-referenced testing procedures.

Refusing to remain scapegoats of the "new" reform movement and of humanists who will not admit that humanistic goals can be attained in a variety of ways, designers of curricula built on discipline structure,

using systematic procedures for structuring their curricula, have succeeded in developing a variety of humanistic courses at all levels of the continuum. After frustrating efforts to achieve their goals through non-structured techniques from open-classroom models to traditional lecture-discussion, teachers have had curricula they designed adopted by school districts or individual schools including an alternate school curriculum (by the Director); a liberal arts physics course with no math (sound, optics, electricity, heat, mechanics, etc.); high school oral communications; nursing history; use of the library; mobility training for the blind; creative writing; Black history; etc. (Gow, 1973b).

Humanistic education has been described as person-oriented, affective, self-actualizing, self-fulfilling. It is said to be oriented towards self-selection of content, self-renewal, self-learning, aimed towards expressive, exploratory, open-ended behaviors and goals. We have shown that all of these ends may be achieved by structured prepackaged self-instructional curricula.

Conclusion

It was at the 1968 Annual Meeting of the American Educational Research Association that Popham listed and refuted arguments put forth against performance objectives. It is 1975, seven years later, and this paper has attempted to refute some of the same arguments, now revived against structured curricula, as well as several new ones. The position that structure and humanism are entirely compatible is bolstered with empirical evidence from the field test of a course in curriculum design and analyses of the curricula produced by students of the course in the External Studies Program at the University of Pittsburgh.

Primarily, this paper has contended that humanistic goals can be attained through a pre-structured curriculum more readily than through an unstructured curriculum precisely because any goal can be attained more readily when use is made of systematic planning.

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